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IS 10242-3-7 (1990): Electrical Installations in Ships, Part 3: Equipment, Section 7: Heating and Cooking Appliances [ETD 20: Electrical Installation]

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जहाजों में विद्युत संस्थापन – विशिष्टि

भाग 3 उपस्कर

अनुभाग 7 तापन और खाना पकाने के साधित्र

Indian Standard

ELECTRICAL INSTALLATIONS IN SHIPS — SPECIFICATION

PART 3 EQUIPMENT

Section 7 Heating and Cooking Appliances

UDC 629·12·066 : 621·316·174·683·9

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Electrical Equipment and Installations in Ships Sectional Committee, ETD 26

FOREWORD

This Indian Standard (Part 3/Sec 7) was adopted by the Bureau of Indian Standards on 19 April 1990, after the draft finalized by the Electrical Equipment and Installations in Ships Sectional Committee had been approved by the Electrotechnical Division Council.

This standard (Part 3/Sec 7) is one of the series of Indian Standards on electrical installations in ships: This series consists of the following parts:

Part 1 General,

Part 2 System design,

Part 3 Equipment,

Part 4 Installation and test of completed installation, and

Part 5 Special features.

Under Part 3, different sections have been prepared to cover individual equipment. This standard (Part 3/Sec 7) has been prepared to cover heating and cooking appliances for use in ships.

In the preparation of this standard, assistance has been taken from IEC Pub 92-307 (1980) 'Electrical installation in ships : Part 307 Equipment heating and cooking appliances', issued by the International Electrotechnical Commission.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ELECTRICAL INSTALLATIONS IN SHIPS — SPECIFICATION

PART 3 EQUIPMENT

Section 7 Heating and Cooking Appliances

1 SCOPE

1.1 This standard (Part 3/Sec 7) is applicable to heating and cooking appliances for use in ships.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
302 : 1979	General and safety requirements for household and similar electrical appliances (*fifth revision*)
10242 (Part 1/ Sec 1) : 1982	Electrical installations in ships : Part 1 General, Section 1 Definitions and general requirements
10242 (Part 2/ Sec 1) : 1982	Electrical installations in ships : Part 2 System design, Section 1 General
12063 : 1987	Classification of degrees of protection provided by enclosures of electrical equipment.

3 GENERAL REQUIREMENTS

3.1 All equipment referred to in the scope shall comply with the requirements specified in relevant Indian Standard on the subject as far as applicable as well as the additional requirements given in this standard (*see also* IS 302 : 1979).

3.2 Heating Elements

The heating elements shall be of materials durable at the highest temperature which they attain in normal service and shall be so arranged that they can readily be replaced. Cooking equipment, galley equipment and water heater shall have insulated heating elements.

3.3 Internal Connections

3.3.1 Electrical connections between heating elements shall be effected either by joining parts of the elements themselves or by such constructions that the terminals and the connecting conductor shall not deteriorate at the maximum temperature to which they may be subjected.

3.3.2 The connections between heating elements and the switches and to the supply cables shall be carried out with the aid of suitable terminals. The connections shall be such that the terminals and switches are not increased in temperature above that for which they are designed. At ambient temperature according to IS 10242 (Part 1/Sec 1) : 1982, the temperature of the terminals for the supply cables (including the internal earthing) may exceed 75°C. These terminals shall be clearly labelled where control panel is required separately for example, cooking ranges. The connections from elements should terminate in terminal box provided with water tight glands and terminals for connection to the control panel.

3.3.3 Connections between heating elements and terminals to which insulated cables may be connected, unless self-supporting or rigidly fixed in position, shall be continuously insulated with suitable incombustible material, that is, shall be by heat and flameproof asbestos covered copper wire insulated with porcelain beads. The flexible leads are to be clamped together to prevent damage due to vibration.

3.3.4 Bare connections shall be made of corrosion-resistant material and shall be suitable for temperature at rated voltage such that no damage occurs in normal use and shall be self supporting. Supports of bare connections shall comply with **3.4**.

3.3.4.1 Connection between heating element and terminal to which insulated cables are connected should be continuously insulated with flame retardant materials, and terminals to be covered with thermo-setting heat shrunk sleeves/mouldings.

3.3.5 Ceramic beads shall be used only when the connections are so fixed or supported that they cannot change their position and the beads can not be damaged in normal use.

3.4 Supports of Live Parts

All live parts subjected to heat, whether elements bare connections or terminals shall be carried on incombustible material, which is moisture resistant or effectively protected against intrusion of moisture.

3.5 Guarding of Live Parts

Heating elements shall be suitably guarded. The guards shall be of robust construction and so fitted that they cannot be brought into contact with any current-carrying part. The openings of the protecting guard shall be sufficiently narrow to prevent the heating elements from being touched or short-circuited when the standard test fingure is applied (*see* IP2X of IS 12063 : 1987). Live parts of cooking appliances shall be so protected that the cooking utensils cannot be brought into contact with them. Spilling or overflowing of liquid or food shall not cause short circuits or insulation failures.

3.6 Temperature Limits of Exposed Parts

Electric heating and cooking appliances shall be so constructed that parts which shall necessarily be handled in use cannot become heated to a temperature exceeding the values given in the following table:

Handles, Grips and the Like Made of	*Maximum Temperature °C During Normal Use Held in the Hand*	
	For Long Period	For Short Period
Metal	55	60
Porcelain and vitreous material, moulded material rubber or wood	65	70

For ambient temperature, *see* IS 10242 (Part 1/ Sec 1) : 1982.

Higher temperatures may be acceptable for parts which normally shall not be handled with unprotected hands, such as, handles of drawers for spilled liquid in cooking ranges.

3.7 Control of Heating and Cooking Appliances

Control switches when in the off position shall isolate the heating elements in all non-earthed poles.

3.8 Position of Control Gear

The position of fuses, switches and other control elements fitted in or near the appliances shall be such that they shall not be subject to temperatures above that for which they are designed and they shall be accessible for inspections, for example, through separate covers.

3.9 Earthing

Appliances, whether portable or fixed, shall be provided with suitable terminals for earthing the metallic framework; such terminals shall be effectively connected to earth.

3.10 Rating Plates

Appliances shall be clearly and indelibly marked at least with the indication of the source of manufacture and type designation, rated voltage(s), rated input and where necessary, with the nature of supply and frequency.

3.11 Insulation Tests

3.11.1 Appliances, including their control equipment, shall be tested when cold by the makers and shall be able to withstand the application of an ac voltage of 1 000 V plus twice the rated voltage with a minimum of 1 500 V at a frequency of 25 Hz to 100 Hz, for one minute, between all current-carrying parts and the metallic frame.

3.11.2 For portable appliances, the leakage current shall not exceed 1 mA, and for stationary appliances 1 mA or 1 mA per-kW rated input, whichever is the larger, for each heating element which can be switched off separately.

4 SPECIAL REQUIREMENTS FOR GALLEY APPLIANCES

4.1 Enclosures of Heating and Cooking Galley Appliances

Cooking and heating appliances and their control equipment fitted in galley spaces shall have a degree of protection of at least IP 44 [*see* Table 5 of IS 10242 (Part 2/Sec 1) : 1982]. Enclosure shall be corrosion-resistant and provided with one or more drainholes.

4.2 Electric Separation of Combined Heating and Cooking Appliances

Combined heating and cooking appliances shall be of such construction that the live parts of the different sections are mechanically separated and that, when replacing components on one section no live parts of the other section can be touched.

4.3 Stability

Portable cooking appliances shall be of such shape or weight so that they cannot easily be overturned.

4.4 Hot plate shall be boarded with removable type storm rails to keep the utensils in place during rolling of the ship. The cooking range should be provided with guard rails of suitable dia all round at top level.

5 SPECIAL REQUIREMENTS FOR SPACE-HEATING APPLIANCES

5.1 Types of Space-Heating Appliances

Space heater shall be of the convector type and of the permanently fixed type, except that heaters of the visible element type may be used, provided they are designed and installed in such a manner as to eliminate the risk of fire.

It is desirable that space heaters shall be equipped with means to interrupt the current if the temperature exceeds the permissible limit.

5.2 Construction of Space-Heating Appliances

Space heaters shall be durable and all parts shall be of strong construction. All screws and nuts shall be effectively locked and suitable for bulkhead mounting.

5.3 Design of Space Heating Appliances

Space heating appliances shall be so designed or protected and so installed that clothing or other combustible material cannot readily be placed over them in such a manner as to cause risk of fire.

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